

(c1) conducting at least one treatment of the heavy fraction separated at step (b) on a catalyst enabling the sulfur compounds to be at least partially decomposed or hydrogenated, and

(d) conducting at least one step to remove the sulfur and nitrogen from at least one intermediate fraction.

12. (Amended) A process as claimed in claim 11, further comprising at least one step (a2) prior to step (b) of increasing the molecular weight of sulfur compounds present in at least one of the feedstock or the effluent from step (a1).

13. (Amended) A process as claimed in claim 11, further comprising a step (c2) of treating effluent from step (c1) on a catalyst.

14. (Amended) A process as claimed in claim 13, in which the hydrogenation of olefins in said effluent of (c1) is limited to less than 20% by volume.

15. (Amended) A process as claimed in claim 13, further comprising a step (e) of mixing at least two of said fractions, at least one of which was desulfurized at step (c1) and optionally (c2) and/or step (d).

21. (Amended) A process according to claim 11, further comprising subjecting effluent from at least one intermediate fraction of step (d) to catalytic reforming.

Please add new claims 22-31 as follows.

--22. A process for producing gasoline with a low sulfur content from a gasoline feedstock comprising:

conducting at least one selective hydrogenation of the diolefins and acetylenic compounds comprised in the feedstock; and separating an effluent of the at least one selective hydrogenation into at least three fractions.

23. A process according to claim 11, wherein the sulfur compounds in the gasoline feedstock comprise ethyl mercaptan, propyl mercaptan, thiophen, CS₂, dimethyl sulphide, methylethyl sulphide, or COS.

24. A process according to claim 11, wherein the sulfur compounds in the gasoline feedstock comprise compounds with a boiling point lower than thiophen.

25. A process of producing gasoline with a low sulfur content from a gasoline feedstock comprising sulfur compounds, diolefins, olefins, aromatics, nitrogen and acetylenic compounds, said process comprising at least the following steps:

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- (a1) conducting at least one selective hydrogenation of the diolefins and acetylenic compounds comprised in the feedstock,
 - (a2) increasing the molecular weight of sulfur compounds present in at least one of the feedstock or the effluent from step (a1),
 - (b) conducting at least one separation of effluent obtained at the end of step a1 into at least three fractions: a light fraction comprising olefins, and from which substantially all of the sulfur has been removed, a heavy fraction in which most of the sulfur compounds initially comprised in the gasoline feedstock is concentrated, and at least one intermediate fraction,
 - (c1) conducting at least one treatment of the heavy fraction separated at step (b) on a catalyst enabling the sulfur compounds to be at least partially decomposed or hydrogenated,
 - (d) conducting at least one step to remove the sulfur and nitrogen from at least one intermediate fraction, and
 - (e) mixing at least two of the fractions, at least one of which was desulfurized at step (c1) and optionally step (d).

26. A process of producing gasoline with a low sulfur content from a gasoline feedstock comprising sulfur compounds, diolefins, olefins, aromatics, nitrogen and acetylenic compounds, said process comprising at least the following steps:

- (a1) conducting at least one selective hydrogenation of the diolefins and acetylenic compounds comprised in the feedstock,
- (a2) increasing the molecular weight of sulfur compounds present in at least one of the feedstock or the effluent from step (a1),
- (b) conducting at least one separation of effluent obtained at the end of step a1 into at least three fractions: a light fraction comprising olefins, and from which substantially all of the sulfur has been removed, a heavy fraction in which most of the sulfur compounds initially comprised in the gasoline feedstock is concentrated, and at least one intermediate fraction and mixing a part of at least one intermediate fraction with the heavy fraction,
- 7. (c1) conducting at least one treatment of the heavy fraction separated at step (b) on a catalyst enabling the sulfur compounds to be at least partially decomposed or hydrogenated,
- (c2) treating effluent from step (c1) on a catalyst so as to decompose the sulfur compounds, and
- (d) conducting at least one step to remove the sulfur and nitrogen from at least one intermediate fraction.

27. A process of producing gasoline with a low sulfur content from a gasoline feedstock comprising sulfur compounds, diolefins, olefins, aromatics, nitrogen and acetylenic compounds, said process comprising at least the following steps:

- (a1) conducting at least one selective hydrogenation of the diolefins and acetylenic compounds comprised in the feedstock,
- (a2) increasing the molecular weight of sulfur compounds present in at least one of the feedstock or the effluent from step (a1),
- (b) conducting at least one separation of effluent obtained at the end of step a1 into at least three fractions: a light fraction comprising olefins, and from which substantially all of the sulfur has been removed, a heavy fraction in which most of the sulfur compounds initially comprised in the gasoline feedstock is concentrated, and at least one intermediate fraction,
- (c1) conducting at least one treatment of the heavy fraction separated at step (b) on a catalyst enabling the sulfur compounds to be at least partially decomposed or hydrogenated,

and mixing a part of at least one intermediate fraction obtained at step (b) with effluent from step (c1),

(c2) treating effluent from step (c1) on a catalyst so as to decompose the sulfur compounds, and

(d) conducting at least one step to remove the sulfur and nitrogen from at least one intermediate fraction.

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28. A process according to claim 22, further comprising increasing the molecular weight of sulfur compounds present in at least one of the feedstock or the effluent from the selective hydrogenation.

29. A process according to claim 22, further comprising conducting at least one treatment of one of the fractions separated on a catalyst enabling the sulfur compounds to be at least partially decomposed or hydrogenated.

30. A process according to claim 22, further comprising removing the sulfur and nitrogen from at least one of the separated fractions.

31. A process according to claim 22, wherein the fractions comprise a light fraction, an intermediate fraction, and a heavy fraction.--